
The Migration of Hematopoietic Progenitors from the Fetal Liver to the Fetal Bone Marrow: Lessons Learned and Possible Clinical Applications.

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Public Summary:

This review article summarizes what is known about the migration of embryonic hematopoietic stem cells during their development in the mouse embryo. We contributed the section that is focused on the applicability of this information to embryonic stem cell-derived hematopoietic progenitors that are generated in vitro.

Scientific Abstract:

The ontogeny of hematopoietic stem cells (HSCs) is complex, with multiple sites of embryonic origin as well as several locations of expansion and maturation in the embryo and the adult. Hematopoietic progenitors (HPs) with diverse developmental potential are first found in the yolk sac, aorta-gonad-mesonephros (AGM) region and placenta. These progenitors then colonize the fetal liver where they undergo expansion and maturation. HSC from the fetal liver colonize the fetal bone marrow, governed by a complex orchestration of transcription programs including migratory molecules with chemotactic activity, adhesion molecules and molecules that modulate the extracellular matrix. Understanding the mechanisms that regulate the patterns of HSC migration between fetal liver to the fetal bone marrow could improve the engraftment potential of embryonic stem cell-derived hematopoietic progenitors (ES-HPs), since these cells might display a migratory behavior more similar to early HPs than to adult HSCs. Understanding the changes in migratory behavior in the context of fetal liver to fetal bone marrow HSC migration could lead to new approaches in the treatment of blood malignancies. Here, we will review the current knowledge in the field of fetal liver to the fetal bone marrow HSCs migration during development, focusing on changes in expression of molecules important for this process and exploring its clinical applications.

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